3GPP TSG-RAN WG2 #110 R2-2005307

Electronic meeting, 1-12 June 2020

Agenda Item: 7.1.10

Source: Ericsson, Sony

**Title: Text Proposal RSS Configurations for narrowBandIndex and timeoffsetgranularity**

Document for: Discussion, Decision

1 Introduction

In RAN1 #98bis and RAN1 #99 RAN1 made the below agreements regarding RSS time and frequency mappings in the RSS for measurements AI:

|  |
| --- |
| **Agreement**  The RSS Frequency Location function is as follows:   1. Possible RSS Frequency Locations can only be within legacy Rel-13 narrowbands 2. A RSS Frequency Location does not span two narrowbands. 3. In each legacy narrowband, there are 3 non-overlapping RSS Frequency Locations 4. Network can configure a subset of narrowbands to contain possible RSS    1. The subset of narrowbands is common across all cells in the network    2. The total number of selected narrowbands that can contain possible RSS isNNB 5. The RSS Frequency Location function:    1. IRSS =PCID MOD (3NNB)    2. Where IRSS is the index of possible RSS Frequency Location starting with the lowest location     **Agreement**   1. For the configuration of theNNB narrowbands, following is supported    1. A bitmap to indicate theNNB narrowbands. The narrowbands belonging to the central 6 PRBs are excluded.       1. By default, all narrowbands, except for the narrowbands belonging to the central 6 PRBs, are selected 2. A one-bit indicator indicating RSS colocation (time and frequency domain) in all cells     **Agreement**  For the RSS Time Offset ORSS, the RSS time offset is distributed acrossMRSS as a function of PCID.  The RSS Time Offset function is:   1. ORSS =PCID/(3NNB) MOD MRSS 2. NOTE: Actual Time Offset (in SFN radio frames) =ORSS × GRSS   Where, the granularity of each unit of GRSS =PRSS / (10 MRSS),  where GRSS is configurable and is common across all cells in the network    **Agreement**  Introduce a time shift RSS, within two consecutiveORSS steps, so that the actual time offset can be shifted byRSS radio frames, i.e.:   1. The Actual Time Offset = (ORSS ×GRSS) +  RSS   The value RSS can be determined by the UE from theORSS of the serving cell |

 The above agreements have not been captured. In this paper, the agreement have been captured in 36.331 and corresponding text proposal is provided.

2 Discussion

For Rel-15 RSS, physical layer obtains the time-frequency location from higher layers. The expectation from RAN1 is the same as adding another interface to that in order to handle the mapping would be cumbersome. Hence, it is proposed to capture the mappings in the 36.331 spec in the new Rel-16 RSS-ConfigCarrierInfo field descriptions with a pointer to the Rel-15 RSS-Config field descriptions regarding how the parameters are derived.

NarrowbandIndex:

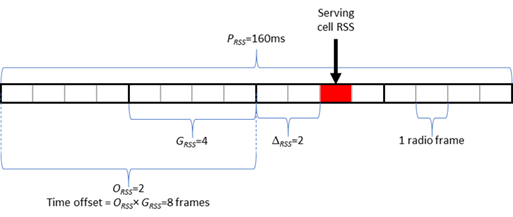
The subset of narrowbands is dependent upon the system bandwidth.  If it is 20MHz, 100 PRBs, there are 16 narrowbands to choose from and a bitmap is used to decide which of these 16 narrowbands would transmit RSS.  Different carrier may have different system bandwidth and network may use different subset of narrowbands for different carrier. UE derives the exact narrowbands for RSS based upon

The RSS Frequency Location function:

IRSS =PCID MOD (3NNB) Where IRSS is the index of possible RSS Frequency Location starting with the lowest location

TimeOffsetGranularity:

On RSS, it is derived from *ORSS* (RSS Time Offset) of the serving cell using ORSS =PCID/(3NNB) MOD MRSS.  For example, considering a periodicity *PRSS*=160ms, and considering the granularity as *GRSS* = 4 frames, then *MRSS* = 4 (from MRSS =PRSS / (10 GRSS)) time locations where each is 4 frames wide, as shown in the figure below.  The serving cell RSS can be precisely indicated using Rel-15 parameters (coloured red).  Since *GRSS* = 4 frames is known, then one can determine *ORSS* from the above equaition. From this RSS can be derived (RSS = The Actual Time Offset (Rel-15 Serving cell) - (ORSS ×GRSS) ).



1. RAN2 to agree on the below draft CR Text Proposal.

Conclusion

Based on the discussion in the previous sections we propose the following:

[Proposal 1 RAN2 to agree on the below draft CR Text Proposal.](#_Toc40991442)

Draft CR/ Text Proposal

**3GPP TSG-RAN WG2 Meeting #110** **R2-200xxxx**

**Electronic Meeting, 1 – 12 Juen 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.331** | **CR** |  | **rev** |  | **Current version:** | **16.0.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | RSS Configurations field description updates on narrowbandIndex and timeOffsetGranularity | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_eMTC5-Core | | | | |  | ***Date:*** | | | 2020-05-21 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The RSS configuration is missing field description on how UE should locate the frequency location from narrowbandIndex and the actual time offset from timeOffsetGranularity | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The field descriptions of narrowbandIndex and timeOffsetGranularity have been udpated | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Mapping of narrowbandIndex to frequency location and timeOffsetGranularity to actual time offset is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

First Change

### 6.3.4 Mobility control information elements

----------- unmodified definitions skipped ------------

#### – *ReselectionThresholdQ*

The IE *ReselectionThresholdQ* is used to indicate a quality level threshold for cell reselection. Actual value of threshold = field value [dB].

*ReselectionThresholdQ* information element

-- ASN1START

ReselectionThresholdQ-r9 ::= INTEGER (0..31)

-- ASN1STOP

#### – *RSS-ConfigCarrierInfo*

The IE *RSS-ConfigCarrierInfo* contains RSS-Configurations for a carrier.

***RSS-ConfigCarrierInfo* information element**

-- ASN1START

RSS-ConfigCarrierInfo-r16::= SEQUENCE

{ narrowbandIndex-r16 BIT STRING (SIZE (1.. maxAvailNarrowBands-r13-1)), timeOffsetGranularity-r16 ENUMERATED {g1, g2, g4, g8, g16, g32, g64, g128}

}

-- ASN1STOP

| ***RSS-ConfigCarrierInfo* field descriptions** |
| --- |
| ***narrowbandIndex***  Bitmap containing narrowbands used for RSS deployment in carrier for CE mode A/B in RRC\_IDLE and RRC\_CONNECTED. Narrowbands including central 6 PRBs are excluded from the bitmap. The RSS Cell Frequency Location of a specific cell is determined according to *IRSS* = *PCID* MOD (3*NNB*) where *IRSS* is the index of possible RSS frequency locations starting with the lowest location and *NNB* is the number of narrowbands, determined from *narrowbandIndex*, such that there are three non-overlapping RSS locations in each narrowband. |
| ***timeOffsetGranularity***  This field indicates the RSS Time Offset granularity (GRSS) for CE mode A/B in RRC\_IDLE and RRC\_CONNECTED, where the values of GRSS depend on the RSS periodicity PRSS as follows: Value *g1* corresponds to 1 frame, value *g2* corresponds to 2 frames, and so on.  GRSS = {1, 2, 4, 8, 16} frames for PRSS = 160 ms  GRSS = {1, 2, 4, 8, 16, 32} frames for PRSS = 320 ms  GRSS = {2, 4, 8, 16, 32, 64} frames for PRSS = 640 ms  GRSS = {4, 8, 16, 32, 64, 128} frames for PRSS = 1280 ms  The RSS Cell Time Offset of a specific cell is a function of PCID and is distributed across MRSS time locations per RSS period, such that MRSS = PRSS /(10 GRSS).  The RSS Cell Time Offset function is determined by ORSS = PCID/(3NNB) MOD MRSS such that the actual time offset in SFN radio frames is (ORSS × GRSS) + ΔRSS where ΔRSS is calculated by using ORSS that is determined by the PCID of the serving cell and RSS frame that is determined by parameters *periodicity*  and *timeoffset* provided in *ce-RSS-Config-r15*. |

#### – *SCellIndex*

The IE *SCellIndex* concerns a short identity, used to identify an SCell.

*SCellIndex* information element

-- ASN1START

SCellIndex-r10 ::= INTEGER (1..7)

SCellIndex-r13 ::= INTEGER (1..31)

-- ASN1STOP

End of change